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GB 2165909 A

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#### (54) Clamping device for hose and pipe connector

(57) A connector comprises an outer retaining projection (4) provided on a tubular connector (2) and an elastically expandible clamping ring (A) comprising an inner hooked projection (7) and an inner clamping projection (8) axially spaced from each other. These projections (7, 8) are formed in such a manner that the ring (A), after having been threaded over the tube (1), may be forcedly slid back onto that portion of the tube (1) fitted onto the tubular member (2) until the hooked projection (7) interferes with and rides over the retaining projection (4) and the clamping projection (8) lies between two adjacent circumferential projections (3) of the tubular member (2). The connector may join an engine coolant hose to a radiator.

FIG. 3

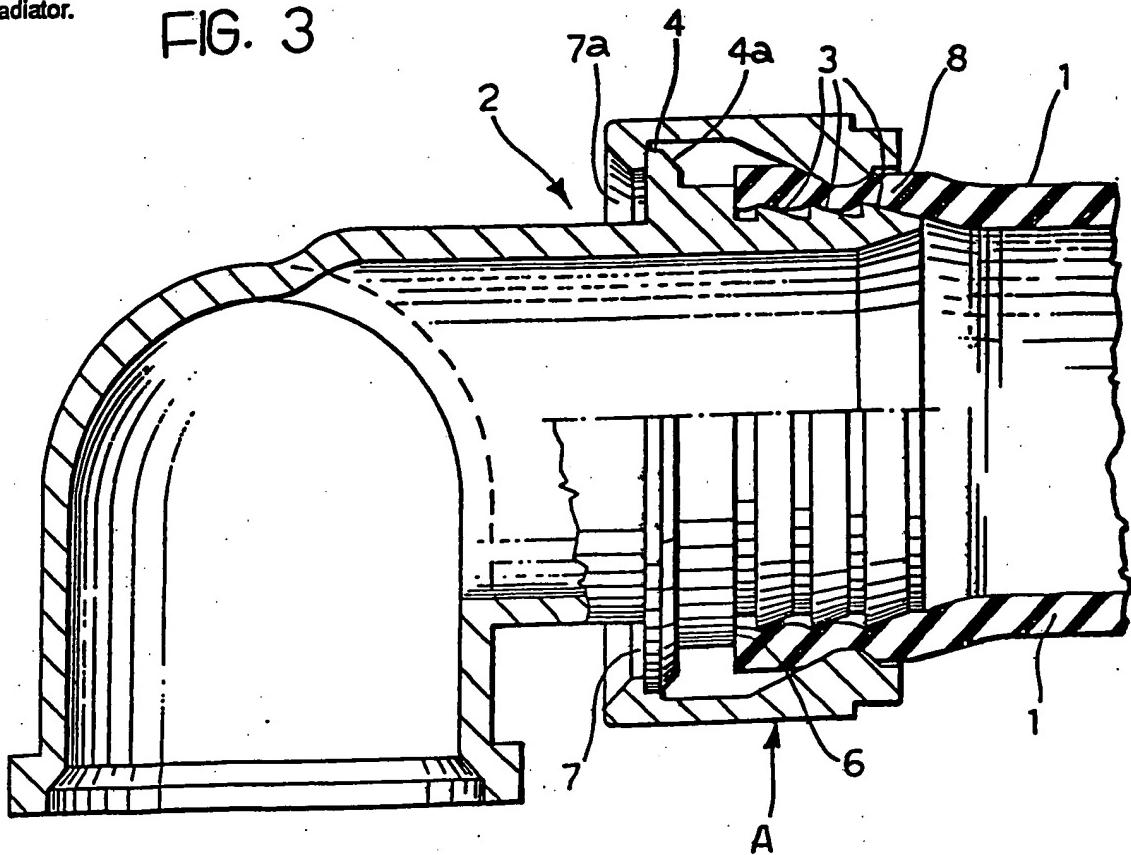


FIG. 1

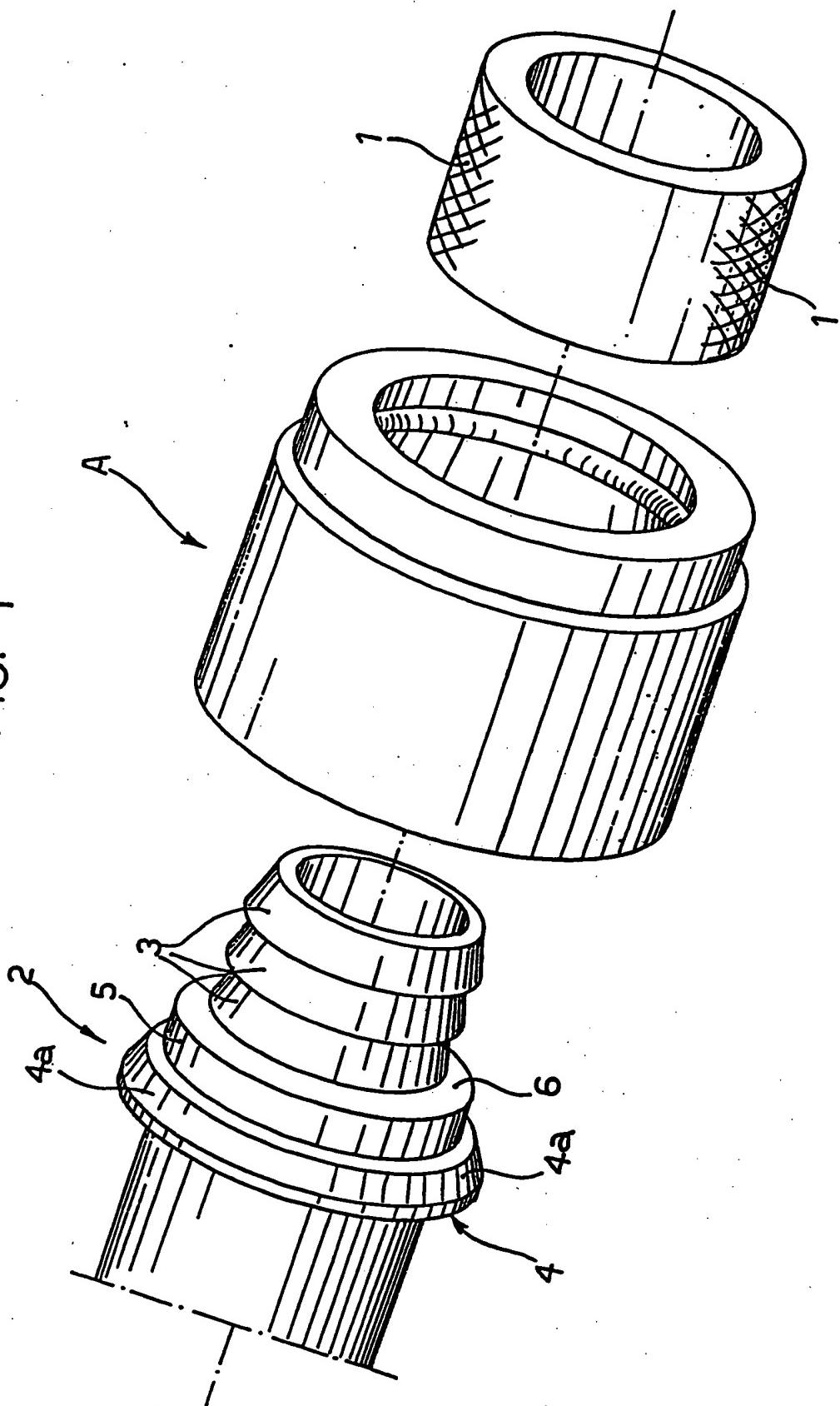


FIG. 2

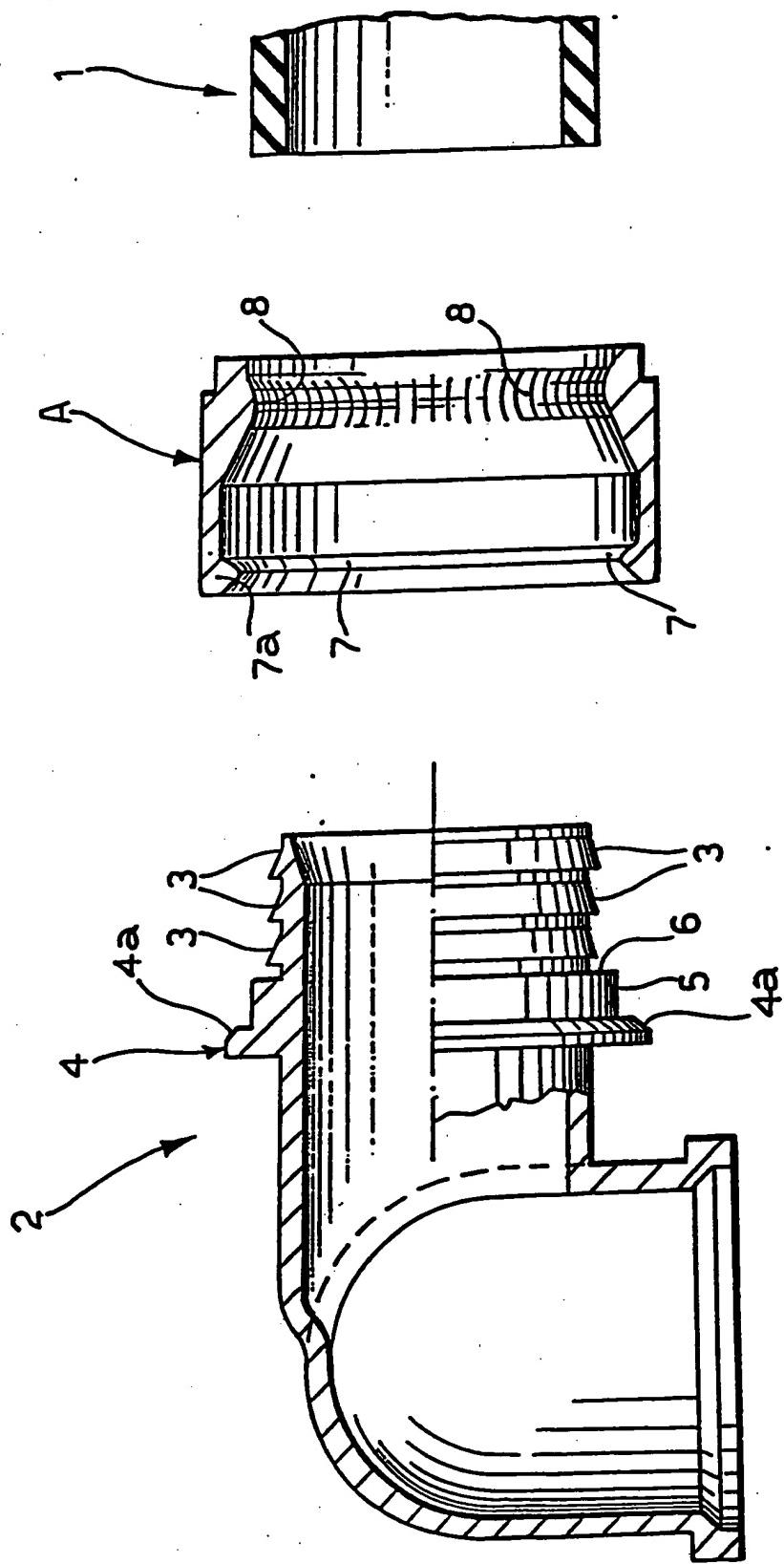
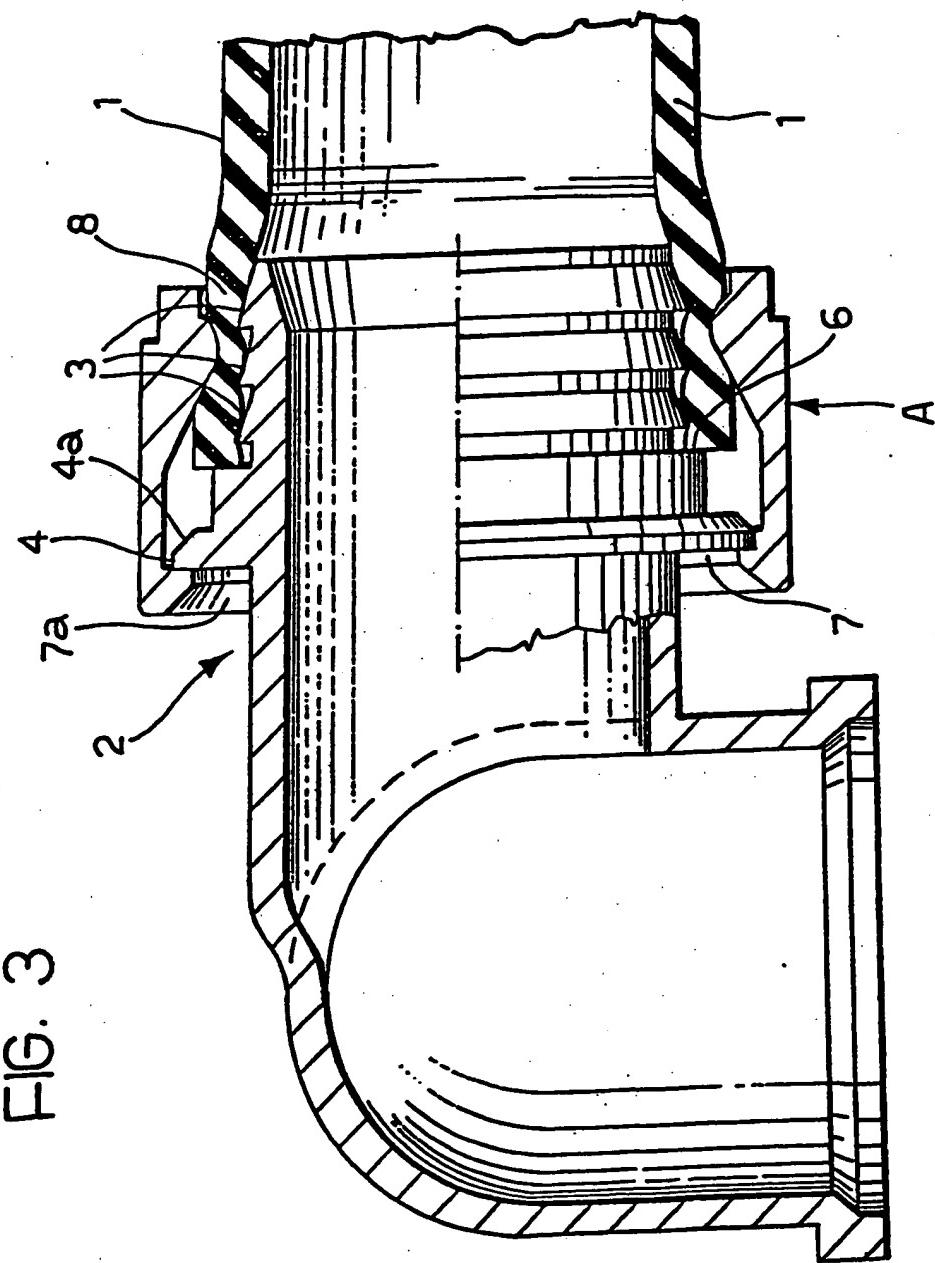


FIG. 3



FLUID-TIGHT CLAMPING DEVICE FOR CLAMPING A FLEXIBLE TUBE  
FORCE FITTED ONTO A TUBULAR CONNECTOR

5       The present invention relates to a device for the fluid-tight clamping of a flexible tube, for example a tube of elastomeric material, force fitted onto a tubular member such as a union, of substantially more rigid material and having a plurality of adjacent, external circumferential end projections.

10      The clamping device according to the invention is characterised in that it includes

15      at least one retaining and positioning projection formed on the outside of the tubular member beyond the circumferential projections in the direction in which the flexible tube is fitted onto the tubular member, and  
20      a clamping ring which can be threaded onto the flexible tube and has an inner hooked projection and an inner clamping projection axially spaced from each other and formed in such a manner that the ring can be forcedly slid onto that portion of the tube fitted onto the tubular member until the hooked projection interferes with and rides over the positioning and retaining projection of the tubular member and the clamping projection lies between the two adjacent circumferential projections of the tubular member.  
25

According to a further characteristic, the positioning and retaining projection of the tubular member has a surface with a profile inclined towards the end circumferential projections and the inner hooked projection of the clamping ring has a corresponding surface with an inclined lead-in profile for coupling with and sliding forcibly over on the inclined surface of the positioning and retaining projection until it has ridden over it.

10

Further characteristics and advantages of the invention will become apparent from the detailed description which follows, given with reference to the appended drawings, provided purely by way of non-limiting example, in which:

15

Figure 1 is a perspective view of a fluid-tight sealing device according to the invention for the connection of a flexible tube with a tubular union;

20

Figure 2 is an axial section of the flexible tube, the union and an associated clamping ring shown in their uncoupled condition, and

25

Figure 3 is a section similar to that of Figure 2, showing the flexible tube fitted onto the union and clamped thereto by means of the device of the invention.

With reference to the drawings, a flexible tube, for example a tube of elastomeric material with or without an internal textile reinforcement, is indicated 1. This

off-cut of flexible tube is to be connected to one end of  
a tubular connecting member such as a union, generally  
indicated 2. This connector is of substantially rigid  
material and has a plurality of external circumferential  
projections 3 adjacent its end. In the embodiment  
illustrated, these projections have saw-tooth profiles.

Conveniently, in a manner known per se, the tube 1 has an  
inner diameter which is slightly less than the outer  
diameter of the projections 3 of the union 2 so that the  
tube 1 must be force fitted over these projections.

Reference 4 in the drawings indicates a retaining and  
positioning projection provided on the outside of the  
tubular union 2 beyond the circumferential projections 3.  
Conveniently, but not necessarily, this projection  
extends around the entire circumference of the union 2  
and has an inclined surface in profile, more particularly  
a surface in the form of a conic frustum indicated 4a  
which is inclined towards the circumferential end  
projections 3.

An intermediate portion 5 of the outer surface of the  
union 2 between the retaining and positioning projection  
4 and the end projections 3 forms a radial, annular  
shoulder 6. The end of the flexible tube 1 comes to bear

against this shoulder when the tube 1 is force fitted over the end projections 3 of the union.

In order to clamp the flexible tube 1 to the union 2 with a fluid-tight seal, a clamping ring indicated A is used in accordance with the invention.

As best seen in Figures 2 and 3, the ring A has an internal hooked projection 7 and an internal clamping projection 8 which are axially spaced apart.

The clamping projection 8 of the ring has an inner diameter which is preferably slightly less than or equal to nominal outer diameter of the flexible tube 1.

The inner diameter of the hooked projection 7 is, on the other hand, preferably greater than the nominal outer diameter of the said tube.

Consequently, the ring A can easily be threaded on to the end of the tube 1 before this is force fitted on to the connector or union 2.

Once the ring A has been threaded on to the tube 1, the end of the latter is force fitted onto the union, and then the ring A is forcedly slid over the tube 1 towards the retaining projection 4 of the union. This operation

is preferably not carried out manually but with the aid  
of a tool or mechanical device.

As seen in Figure 2, the hooked projection 7 of the ring  
5 A has a lead-in surface 7a which faces outwardly, its  
profile being inclined like the profile of the surface 4a  
of the retaining projection 4 of the union 2. The inner  
diameter of the projection 7 of the ring A is less than  
the outer diameter of the retaining projection 4 of the  
10 union.

When the ring A is forcedly slid over the tube 1 fitted  
onto the union 2, the frusto-conical lead-in surface 7a  
of the hooked projection first contacts the surface 4a of  
15 the retaining projection of the union. As the ring A is  
thrust further in the direction of the projection 4 of  
the union, that portion of the ring A formed with the  
hooked projection 7 expands elastically so as to ride  
over the projection 4 of the union to reach the hooked  
20 position shown in Figure 3. Once it has passed this  
projection, the resilient contraction of that portion of  
the ring A which had previously expanded forms a  
substantially irreversible engagement of this ring with  
the projection or flange 4 of the union.

25  
The axial distance between the projections 7 and 8 of the  
ring A is suitably such that, in the coupled condition

shown in Figure 3, the projection 8 compresses and grips a zone of the wall of the flexible tube 1 between the crests of two adjacent circumferential projections 3 of the union. This ensures highly reliable fluid-tight clamping.

The union connector 2 illustrated in the drawings may, for example, be the inlet connector or the outlet connector for a radiator of a motor vehicle having an internal combustion engine, the flexible tube 1 being for example, a hydraulic pipeline of the water cooling system of the internal combustion engine.

The device according to the invention is not only suitable for use in the case just illustrated, however, but is also usable in all those circumstances in which hose-clips are conventionally used.

The invention naturally extends to all embodiments which achieve equal utility by means of the same innovative concept.

Thus, for example, one or other or both of the projections 4 and 7 need not extend around the entire circumference of the ring and the union respectively but only around (one or more) sectors thereof.

CLAIMS

1. A fluid-tight clamping device for a flexible tube  
(1) force fitted onto a substantially rigid tubular member (2) - such as a union - and having a plurality of adjacent external circumferential end projections (3);  
5 characterised in that it includes  
at least one retaining and positioning projection (4) formed on the outside of the tubular member (2) beyond the circumferential projections (3), and  
10 a clamping ring (A) which is elastically expansible and can be threaded onto the flexible tube (1) and has an inner hooked projection (7) and an inner clamping projection (8) axially spaced from each other and formed in such a manner that the ring (A) can be forcedly slid onto that portion of the tube (1) fitted onto the tubular member (2) in the direction of the tubular member (2) until the hooked projection (7) interferes with and rides over the positioning and retaining projection (4) of the tubular member (2) and the clamping projection (8) lies  
15 between the two adjacent circumferential projections (3) of the tubular member (2).  
20
2. A device according to Claim 1, characterised in that the positioning and retaining projection (4) of the tubular member (2) has a surface (4a) with a profile inclined towards the circumferential projections (3) and in that the inner hooked projection (7) of the clamping  
25

ring (A) has a corresponding lead-in surface (7a) with an inclined profile for coupling with and sliding forcibly over the inclined surface (7a) of the positioning and retaining projection (7) so that the ring (A) expands elastically and the hooked projection (7) rides over the positioning and retaining projection (4).

3. A device according to any one of the preceding claims, characterised in that the positioning and retaining projection (4) is constituted by a circumferential flange of the tubular member (2).

4. A device according to any one of the preceding claims, characterised in that the inner hooked projection (7) of the clamping ring (A) extends around the entire inner circumference of the ring (A).

5. A device according to any one of the preceding claims, characterised in that the inner clamping projection (8) of the ring (A) extends around the entire inner circumference of the ring (A).

6. A device according to any one of the preceding claims, characterised in that the end circumferential projections (3) of the tubular member (2) have saw-tooth profiles.

7. A device according to claim 1 or 2, characterised in that the inner clamping projection (8) of the ring (A) has a rounded profile.

5 8. A device according to any one of the preceding claims, characterised in that the tubular member (2) has a stop shoulder (6) between the retaining and positioning projection (4) and the end circumferential projections (3) for abutment by the end of the flexible tube (1).

9. A fluid-tight clamping device substantially as hereinbefore described and as shown in the accompanying drawings.

**Section 17 (1)(b) Search Report**

**Relevant Technical fields**

- (i) UK CI (Edition K ) F2G (G24B, G24Z)  
 (ii) Int CL (Edition 5 ) F16L 33/207

**Search Examiner**

B J PROCTOR

**Databases (see over)**

- (i) UK Patent Office  
 (ii)

**Date of Search**

2 JUNE 1992

Documents considered relevant following a search in respect of claims

1-9

Category (see over)	Identity of document and relevant passages	Relevant to claim(s)
A	GB 2165909 A (EARL'S SUPPLY CO) Eg figure 3	1-9

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